Patent Claims

1. A method for determination of the position (x, y) of at least one reflection point (R_{1-2}) on the surface of an obstruction (200), comprising the following steps:

calculation of a first distance (r_1) between the reflection point and a first position (x_1) of a distance measurement apparatus (100), in particular of an ultrasound distance measurement apparatus, from a time period between transmission of a first transmitted signal from the distance measurement apparatus at the position (x_1) to the obstruction and reception of a received signal as part of the transmitted signal reflected on the obstruction (200);

characterized by

calculation of a second distance (r_2) of the reflection point with respect to a second position (x_2) of the distance measurement apparatus (100) analogously to the calculation of the first distance (r_1); and

calculation of the position (x, y) of the reflection point (R_{1-2}) with the aid of the triangulation method from a first value pair (x_1, r_1), comprising the first position (x_1) of the distance measurement apparatus and the first distance (r_1) and a second value pair (x_2, r_2), comprising the second position (x_2) of the distance measurement apparatus and the second distance (r_2).

2. The method as claimed in one of the preceding claims, characterized in that the x coordinate (x) of the position of the reflection point (R_{1-2}) is calculated using the following equation (1):

$$x = \frac{r_2^2 - r_1^2 - x_2^2 + x_1^2}{2*(x_1 - x_2)} \qquad (1)$$

where

x_1 represents the first position of the distance measurement apparatus (100);

x_2 represents the second position of the distance measurement apparatus (100);

r_1 represents the first distance of the reflection point (R_{1-2});

and

r_2 represents the second distance of the reflection point (R_{1-2}).

3. The method as claimed in claim 2, characterized in that the calculated x coordinate (x) of the position of the reflection point (R_{1-2}) is rejected if the magnitude of the difference between the x coordinate (x) of the position of the reflection point (R_{1-2}) and the x coordinate of the first or second position (x_1, x_2) of the distance measurement apparatus (100) is less than a predetermined Δx threshold value.

4. The method as claimed in one of the preceding claims, characterized in that the y coordinate (y) of the position of the reflection point is calculated using the following equation (2):

$$y = \sqrt{r_2^2 - (x - x_2)^2} \qquad (2)$$

where

x represents the x coordinate of the position of the reflection point (R_{1-2});

x_2 represents the second position of the distance measurement apparatus;

and

r_2 represents the second distance of the reflection point.

5. The method as claimed in claim 4, characterized in that the calculated y coordinate (y) of the position of the reflection point (R_{1-2}) is rejected if the magnitude

of the difference between the y coordinate (y) of the position of the reflection point (R_{1-2}) and the first or second distance (r_1, r_2) of the reflection point (R_{1-2}) to the distance measurement apparatus is less than a predetermined Δr threshold value.

6. The method as claimed in one of the preceding claims, characterized in that the first and the second value pair (x1, r1) (x2, r2) are selected in pairs from a large number of value pairs (xi, ri where i = 1...I), preferably once this large number of value pairs (xi, ri) has previously been smoothed.

7. The method as claimed in claim 6, characterized in that the selection of value pairs in pairs from the large number of value pairs and the calculation, based on this, of in each case one position (x, y) of a reflection point (R_{1-2}) is repeated for a large number of differently positioned reflection points (R_{1-2}) on the obstruction (200).

8. The method as claimed in claim 7, characterized in that the selection of the value pairs in pairs from the large number is fundamentally carried out as required, but preferably cyclically.

9. A computer program with a program code for a distance measurement apparatus (100), in particular an ultrasound measurement apparatus, **characterized in that** the computer program is designed to carry out the method as claimed in one of claims 1 to 8.

10. A data storage medium **characterized by** the computer program as claimed in claim 9.

11. A distance measurement apparatus (100), in particular an ultrasound distance measurement apparatus, for determination of the position (x, y) of

at least one reflection point (R_{1-2}) on the surface of an obstruction (200), comprising:

a calculation device for calculation of a first distance (r_1) between the reflection point and a first position (x_1) of the distance measurement apparatus (100) from a time period between transmission of a first transmitted signal from the distance measurement apparatus (100) at the position (x_1) to the obstruction and reception of a received signal as part of the transmitted signal reflected on the obstruction (200);

characterized in that

the calculation device is designed to calculate a second distance (r_2) of the reflection point with respect to a second position (x_2) of the distance measurement apparatus analogously to the calculation of the first distance; and to calculate the position (x, y) of the reflection point (R_{1-2}) with the aid of the triangulation method from a first value pair (x_1, r_1), comprising the first position (x_1) of the distance measurement apparatus (100) and the first distance (r_1) and a second value pair (x_2, r_2), comprising the second position (x_2) of the distance measurement apparatus and the second distance (r_2).